1 257 720

PATENT SPECIFICATION

(11) 1 257 720

NO DRAWINGS

(21) Application No. 15788/69 (22) Filed 26 March 1969

(31) Convention Application No. 716309 (32) Filed 27 March 1968 in

(33) United States of America (US)

(45) Complete Specification published 22 Dec. 1971

(51) International Classification A 23 k 1/20

(52) Index at acceptance A2B J3A2 J3F1 J3G3 J5

(54) ANIMAL FOODS

(71) We, PERK FOODS Co., a Corporation organised under the Laws of the State of Illinois, United States of America, of 500 North Dearborn Street, Chicago, Illinois, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to animal foods, particularly expanded, fat-coated animal foods, and to a process for making such foods. A known animal food product of this type is made as follows. A nutritionally balanced mixture of finely divided food products such as corn meal, meat and bone meal, soy meal and wheat middlings, supplemented by vitamins and minerals, is wetted with water and steam, heated under compression to a temperature above the boiling point of water, and extruded out of an extrusion die into the open air. As the super-heated mass passes out of the die, it expands by flash vaporization of the water and rupture of the starch particles into a porous, expanded product. This product is then cut into chunks and dried to form discrete, porous chunks. Melted fat, usually tallow, is applied to the chunks, as by spraying, to form an outer coating. Before feeding, water may be added to the food to cause its rehydration into soft, edible particles, or the product may be fed dry, if desired.

This known fat-coated product has a number of disadvantages. First, its fat-coated surface is naturally greasy, which gives an undesirable "feel" to the material and which commonly forces packagers to sell the product in grease-resistant lined containers, because paper containers absorb the fat, resulting in an unsightly and unsalable package.

Second, the volatile flavouring agents which are naturally present in the fat-coated food product, as well as any such agents which are added to increase palatability, have a tendency to diffuse through the fat coating and to evaporate. Thus the palatability of these fat-coated food products has a tendency to decrease upon standing as the volatile flavouring agents slowly evaporate.

Third, the fat coating on the product is exposed to the oxygen of the air and is thus subject to oxidative rancidity.

Finally, such fat-coated, expanded food products are subject to breakage in the bag during shipping and handling, resulting in undesirable crumbling of the product.

This invention provides an improvement in fat-coated, expanded animal food products whereby the above-mentioned disadvantages are minimized or eliminated without detracting from the palatability of the product.

According to one aspect of the invention an animal food product comprises porous, expanded chunks having a nutritionally balanced mixture of starch-containing and protein-containing constituents, the chunks being covered with a coating of fat and having a coherent coating comprising dextrins, e.g. dextrinized starch, outside the fat.

According to another aspect of the invention a process of coating a porous, expanded animal food comprising chunks having a nutritionally balanced mixture of starch-containing and protein-containing constituents and covered with a coating of fat comprises applying to the fat-coated chunks a composition comprising from 10 to 50 weight per cent of dextrins, e.g. dextrinized starch, and drying the composition to form a coherent coating over the fat coating.

The coating comprising dextrins (hereinafter referred to as the dextrin coating) covers the fat coating to eliminate the conventional, greasy feel of the fat-containing animal food and to seal each chunk with a coating which is essentially impermeable to flavouring agents, thus preventing the flavouring agents from escaping from the food, thereby prolonging its palatability.

The flavouring agents may be of several different types with respect to solubility, and the invention may be modified to provide for optimum flavour utilization with each type. For example, water-soluble or water-dispersible flavouring agents are preferably

incorporated into the dextrin coating itself, by incorporation into the coating solution. Such flavourings will remain bound in the coating until released by addition of water at feeding time. Fat-soluble flavourings are most advantageously applied in the fat coating which is thereafter coated with the dextrin coating. Here again, the dextrin coating protects the flavouring until released by the addition of water. This invention makes possible the use of soft or liquid fatty flavourings, such as chicken fat or fish oil, which could not be applied to the surface of expanded chunks before because of their tendency to migrate or run. With the present invention, such fatty flavourings may be incorporated into the fat coating on the chunks; and any tendency of the flavourings to run is controlled by the superimposed dextrin coating. Flavourings which are neither water-soluble nor fat-soluble may be applied as a dusty layer over the fat coating, and over which the dextrin coating is then applied. Fish meal is typical of the flavourings of this type. In all of the flavoured embodiments discussed above the flavouring agent is located at or near the surface of the chunks and is therefore particularly effective because of its ready availability to the senses of the animal.

The dextrin coating is hard and coherent, and readily adheres to the fat. It protects the chunks from breaking apart and crumbling during handling and shipping. However, the dextrin coating is water-dispersible, and thus when water is applied to the product, the dextrin coating is rapidly penetrated by the water so that the dry food product is quickly rehydrated and made ready for consumption.

Dextrins are higher polysaccharides of dextrose and maltose, and are breakdown products of starch. Starch can be dextrinized by a conventional hydrolysis process in which dextrins are formed from starch. For example, starch can be dextrinized by hydrolyzing it with amylase or in an acid environment in the conventional manner. Starch can also be dextrinized by conventional thermal degradation. Any type of starch can be dextrinized, e.g. corn starch, potato starch or arrowroot starch. The dextrinized starch may contain undegraded starch along with the dextrins formed by breaking down the starch molecules, and it may contain small amounts of dextrose and maltose formed by complete hydrolysis of some of the starch. Alternatively, artificially-synthesized dextrins can be used as an equivalent to dextrinized starch.

The dextrins may be applied to the fat-coated, expanded animal food in the form of a solution in water. The concentration of dextrins in the water may be varied depending on the solubility of the dextrins, the temperature of the solution, and the viscosity utilizable in the particular method of application. Concentrations from 10 to 50 weight per cent of dextrins and from 50 to 90 weight per cent of water have been found to be suitable. The dextrins may be applied by dipping the chunks of fat-coated food in the solution, or by spraying or otherwise applying the solution to the food chunks. Good results are obtained when from 5 to 30 weight per cent of the composition containing dextrins and water is applied to the animal food, based on the weight of the animal food before applying the dextrin coating. The weight of dextrins present in the finished product is typically from 1 to 15 weight per cent of the total product. Generally, chunks having rough surfaces require greater amounts of coating material than chunks with smooth surfaces for achieving an effective barrier over the fat.

When it is desired to add flavouring additives to the coating composition containing dextrins and water, the formulation typically contains from 10 to 30 weight per cent of dextrins, from 0.5 to 20 weight per cent of flavouring additives and from 50 to 90 weight per cent of water.

Typical water-soluble or water-dispersible flavouring additives and nutrients which can be added to the dextrin coating composition, alone or in combination, are vanillin, or vanilla extract, meat or fish solubles, cocoa, smoke flavour, protein concentrate, liver, dried whey, dried milk, meat extract and artificial flavours. Flavouring additives are suitable added in concentrations to constitute, in total, from 0.1 to 4 weight per cent, based on the weight of the total product. A common flavouring additive is sucrose, which is typically added to a dextrin-water composition in such a concentration that the total product containing the dextrin coating has from 0.2 to 4 weight per cent of added sucrose. Other additives which can be added to the dextrin coating composition include food colours, preservatives and water-soluble vitamins.

Fat-soluble flavouring additives or nutrients may be used in the dextrin coating composition when combined with a suitable emulsifier to make them water-dispersible.

After application of the dextrin-water coating to the fat-coated chunks of animal food, the coating is allowed to dry, e.g. in a stream of hot air, or by any other conventional means.

If desired, an additional coating of a dry gravy-forming agent such as a combination of a thickener (e.g. carboxymethylcellulose) and a dye can be added on top of the dextrin coating to form an artificial gravy on the addition of water. It has been found that dry gravy-forming agent adheres well to the dextrin coating although the coating is not

sticky to the touch. When the product having successive coatings of fat, dextrins and gravy-forming agent is wetted with sufficient water, the gravy-forming agent dissolves rapidly in the excess water to colour it and thicken it and create the appearance of a gravy.

The invention is illustrated by the following Examples.

Example 1

Thirty pounds of chunks of an expanded, dry animal food containing corn meal, fish meal and other starches and proteins were agitated in a tumbler and simultaneously sprayed with thirty ounces of melted tallow to provide a thin fat coating on the chunks. The chunks measured from $^3/_8$" to $^3/_4$" across.

A coating composition was prepared by adding to 65 parts by weight of water, 23 parts of a dextrin having high clarity and low viscosity in water at 190°F. (Crystal Gum, sold by National Starch and Chemical Corporation, United States of America), and prepared by the dextrinizing of tapioca starch. The dextrin was added slowly to the water while cold with continuous agitation to prevent lumping. To this mixture were added 2 parts by weight of sucrose, 0.05 parts of Ethavan (an artificial vanilla flavouring), 0.05 parts of vanillin, 5 parts of cocoa and 5 parts of dried milk. The mixture was then heated to 180°-190°F, and 0.03 parts by weight of a red food dye was added.

One hundred parts by weight of fat-coated chunks of animal food were then sprayed with 20 parts by weight of the above hot coating composition while agitating the chunks in a revolving pan. After the spray application was complete, the chunks were dried to a moisture content of 8 to 12 per cent with a hot air blower.

The finished product consisted of chunks having a hard, glazed, non-greasy coating sealing the interior of each chunk. The dextrinized starch content of the finished product was 4.3 weight per cent based on total weight.

One hundred grams of the above coated product was immersed in 300 ml of water having a temperature of 70°F for two minutes. At the end of this period, the chunks were removed from the water and broken open. It was noted that approximately 70 per cent of the expanded material present had been rehydrated by penetration with water to form a soft, water-soaked material. The dextrinized starch coating generally dispersed into the surrounding water during this period.

Another sample of the above chunks of animal food coated with dextrinized starch was placed on a filter paper in an oven at 100°C for 72 hours. After this time, no fat stains were noted on the filter paper, whereas conventional fat-coated animal foods were found to stain a filter paper after only 15 minutes of contact at 100°C. The coated animal food prepared as above shows no staining of Kraft paper similar to the type which is used as liners in packaging animal foods, upon contact for two months at 100°F.

Example 2

Twenty three parts by weight of dextrinized starch, 2 parts of sucrose, 5 parts of dried meat solubles were added to 70 parts of water in a kettle, with good agitation to prevent lumping. The temperature was raised to 190°F to assure complete dissolution.

One part by weight of the above-described solution was coated into 5 parts of fat-coated chunks in a tumbler; and the preparation was thereafter dried.

When the preparation was moistened with an equal weight of water, it rehydrated rapidly and was highly palatable to dogs under kennel feeding conditions.

WHAT WE CLAIM IS:—

1. An animal food product comprising porous, expanded chunks having a nutritionally balanced mixture of starch-containing and protein-containing constituents, the chunks being covered with a coating of fat and having a coherent coating comprising dextrins outside the fat.

2. A product as claimed in Claim 1 in which the chunks measure from $^3/_8$" to $^3/_4$" across.

3. A product as claimed in Claim 1 or Claim 2 in which the weight of the dextrins is from 1 to 15 weight per cent of the total product.

4. A product as claimed in any of the preceding claims in which the dextrin coating defines the outer surface of the product.

5. A product as claimed in any of Claims 1 to 3 in which the dextrin coating is covered with an outer coating of a powdered, dry gravy-forming agent comprising a thickener and a dye.

6. A product as claimed in any of the preceding claims in which the dextrin coating contains from 0.1 to 4 weight per cent of flavouring additives, based on the weight of the total product.

7. A product as claimed in any of the preceding claims in which the dextrin coating contains from 0.2 to 4 weight per cent of added sugar, based on the weight of the total product.

8. A product as claimed in any of the preceding claims in which the dextrin coating comprises dextrinized starch.

9. An animal food product as claimed in Claim 1 and substantially as described in either of the Examples.

10. A process of coating a porous, expanded animal food comprising chunks

having a nutritionally balanced mixture of starch-containing and protein-containing constituents and covered with a coating of fat, which comprises applying to the fat-coated chunks a composition comprising from 10 to 50 weight per cent of dextrins, and drying the composition to form a coherent coating over the fat coating.

11. A process as claimed in Claim 10 in which the said composition contains from 10 to 30 weight per cent of dextrins, from 0.5 to 20 weight per cent of flavouring additives and from 50 to 90 weight per cent of water.

12. A process as claimed in Claim 10 or Claim 11 in which the weight of said composition applied is from 5 to 30 weight per cent, based on the weight of the animal food before coating with the composition.

13. An animal food product comprising porous, expanded chunks having a nutritionally balanced mixture of starch-containing and protein-containing constituents, covered with a coating of fat and with a dextrin coating over the fat, the dextrin coating having been applied by a process as claimed in any of Claims 10 to 12.

KILBURN & STRODE,
Chartered Patent Agents,
Agents for the Applicants.

(8806) Printed by Her Majesty's Stationery Office Press, Edinburgh, 1971.
Published by The Patent Office, 25 Southampton Buildings, London, WC2A 1AY,
from which copies may be obtained.